Oregon Institute of Technology, Portland-Metro

Bachelor of Science in Electrical Engineering

Curriculum Map according to Catalog Year 2021-22

Any deviations from courses listed below must be approved by academic advisor, department chair, and Registrar's office. Substitution is not official until shown in official student records.

Course Notes	Required Oregon Tech Courses				Pre- and Co-requisites	FRESHMAN			SOPHOMORE			JUNIOR			SENIOR		
	Prefix	No.	Course Title	Credits	+Corequisite * Pre- or corequisite ^Grade ≥ C not reqd	F	W	S	F	W	S	F	W	S	F	W	S
Communications				18													
	SPE	111	Public Speaking	4				4									
	SPE	321	Small Group & Team Communication	3	SPE 111^							3					
	WRI	121	English Composition	4	SAT/ACT or writing sample	4											
	WRI	227	Technical Report Writing	4	WRI 122, SPE 111*				4								
1	WRI	3XX/4XX	Advanced Writing Elective	3	Per catalog									3			
Math/Science				48													
	MATH	251	Differential Calculus	4	MATH 112	4											
	MATH	252	Integral Calculus	4	MATH 251		4										
	MATH	253	Sequences and Series	4	MATH 252						4						
	MATH	254	Vector Calculus I	4	MATH 252			4									
	MATH	321	Appl. Differential Equations I	4	MATH 252			4									
2	MATH	341	Linear Algebra I	4	MATH 252					4							
2	MATH	465	Mathematical Statistics	4	MATH 254										4		
3	CHE	201	General Chemistry I	3	CHE101/104, MATH 111*, CHE 204*	3											
3	CHE	204	General Chemistry I Laboratory	1	CHE 201+	1											
4	MATH/CHE/PHY	2XX/3XX/4XX	Math/Science Elective	4	Per catalog		4										
	PHY	221	General Physics w/ Calculus	4	MATH 251, MATH 252*				4								
	PHY	222	General Physics w/ Calculus	4	MATH 252, PHY 221					4							
	PHY	223	General Physics w/ Calculus	4	PHY 222						4						
General Education				24													
See Catalog for more info.			Social Science elective	3	Per catalog		3										
			Social Science elective	3	Per catalog						3						
			Social Science elective	3	Per catalog								3				
			Social Science elective	3	Per catalog												3
			Humanities elective	3	Per catalog			3									
			Humanities elective	3	Per catalog					3							
			Humanities elective	3	Per catalog											3	
	MGT	345	Engineering Economy	3	MATH 105 or MATH 111			3									
Lower Division Electrical Engineering and Programming				27													
	EE	131	Digital Electronics I	4	MATH 111*	4											
	EE	133	Digital Electronics II	4	EE 131 or CST 162, MATH 111^		4										
	EE	221	Circuits I	4	MATH 252*				4								
	EE	223	Circuits II	4	EE 221, MATH 252					4							
5	EE	225	Circuits III	4	EE 223, MATH 321*						4						
	CST	116	C++ Programming I	4	MATH 111+				4								
	ENGR	267	Engineering Programming	3	MATH 251					3							
Circuits, Systems, DSP, and Communications				18													
	EE	341	Electricity and Magnetism with T-lines	4	EE 123 or EE 221, MATH 252, MATH 254, PHY 202 or PHY 222							4					
	EE	461	Control System Engineering	4	EE 225, ENGR 266 or 267, MATH 321										4		
	EE	430	Linear Systems and DSP	5	EE 225 or EE 320											5	
	EE	401	Communication Systems	5	EE 311 or EE 430												5
Analog & Mixed Signal Electronics				13													
	EE	321	Electronics I	5	EE 123 or EE 223, EE 225* or EE 320*, MATH 252							5					
	EE	323	Electronics II	5	EE 321, EE 225 or EE 320								5				
	EE	343	Solid State Electronics Devices	3	EE 321+, MATH 252, PHY222 or PHY 202									3			
Microcontroller Design, Digital Design, and HDL				12													
	EE	333	Introduction to Microcontrollers	4	CST 116, EE 131 or EE 133 or EET 216							4					
	EE	331	Digital System Design with HDL	4	EE 133								4				
	EE	335	Advanced Microcontrollers	4	EE 333								4				
Technical Electives and Capstone Project				24													
6	EE		Engineering Design Elective	4	Per catalog									4			
7	(R)EE	3XX/4XX	Technical Elective	4	Per catalog									4			
	(R)EE	3XX/4XX	Technical Elective	4	Per catalog										4		
	(R)EE	3XX/4XX	Technical Elective	3	Per catalog											3	
	(R)EE	3XX/4XX	Technical Elective	3	Per catalog												3
	ENGR	465	Capstone Project	2	Junior standing & instructor consent										2		
	ENGR	465	Capstone Project	2	Junior standing & instructor consent											2	
	ENGR	465	Capstone Project	2	Junior standing & instructor consent												2
			Total Required Credits	**184**		16	15	18	16	18	15	16	16	14	14	13	13

Notes:

1) Select from: WRI 327 Advanced Technical Writing, WRI 350 Documentation Development, or WRI 410 Proposal and Grant Writing

2) MATH 341 can be replaced with MATH 261. MATH 465 can be replaced with MATH 361.

3) CHE 201/4 can be substituted with CHE 221

4) Select from: CHE 202/205, CHE 222, MATH 322, MATH 327, MATH 342, MATH 354, MATH 421, MATH 451, MATH 454, PHY 410, PHY 448, PHY 449, PHY 450, PHY 451, PHY 452, PHY 453, or an advisor-approved Math/Science elective.

5) EE 225 can be substituted with EE 320

6) EE207 Engineering Design and Invention, EE432 Advanced Digital System Design, or other advisor-approved technical elective.

7) Technical electives include upper division EE and REE courses (except EE 311, EE 347, EE 320, and EE 431), and courses listed for a specific BSEE technical emphasis. Other courses may be used with advisor approval.

Last Revision: 7/14/21

BSEE Degree Technical Emphases

Students in the BSEE program may chose to specialize in a particular area by selecting their engineering technical elective courses from the appropriate list below. These lists of courses are provided for guidance. Students are not required to select a technical emphasis, and technical emphases will not appear on the students' transcripts.

1. Electrical Power

Choose at least three engineering electives from the following list:

EE 419	Power Electronics
REE 243	Electrical Power
REE 253	Electromechanical Energy Conversion
REE 345	Wind Power
REE 413	Electric Power Conversion Systems
REE 453	Power System Analysis
REE 454	Power System Protection and Control

2. Optical Engineering

Choose at least three engineering electives from the following list

EE 448	Geometric Optics
EE 449	Radiometry and Optical Detection
EE 450	Physical Optics
EE 451	Lasers
EE 452	Waveguides and Fiber Optics
EE 453	Optical Metrology

3. Systems Engineering and Technical Management

Choose the engineering electives from the following list:

SEM 421	Systems Engineering
SEM 422	Advanced Systems Engineering
SEM 425	Advanced Engineering Management

4. Microelectronics

Choose at least three engineering electives from the following list:

EE 307	Embedded Systems Testing	4
EE 325	Electronics III	5
EE 407	Adv. LabVIEW Programming	4
EE 421	Analog IC Design	5
EE 432	Advanced Digital System Design	4
EE 423	CMOS Digital IC Design	5
EE 426	RF/Microwave Systems	4
EE 485	Printed Circuit Board Design	4

5. Renewable Energy

Choose at least three engineering electives from the following list:

EE 419	Power Electronics	4
ENGR 355	Thermodynamics	3
REE 243	Electrical Power	4
REE 253	Electromechanical Energy Conversic	4
REE 345	Wind Power	3
REE 346	Biofuels and Biomass	3
REE 412	Photovoltaic Systems	3
REE 413	Electric Power Conversion Systen	3
REE 427	Greenhouse Gas Accounting/Footp	3

6. Robotics, Automation, and Control

Choose at least three engineering electives from the following list:

ENGR 420	Engineering Modeling	4
ENGR 421	Automation for Robotics	4
ENGR 422	Process Control	4
ENGR 423	Motion Control in Mechanisms and Robo	4
REE 463	Energy Systems Instrumentation	3

Graduation

Students must file an Application for Degree at least two terms prior to the term of Graduation (visit http://www.oit.edu/registrar/graduate). A minimum of 45 credits must be completed at Oregon Tech before a degree is awarded. Baccalaureate students must complete a minimum of 60 credits of upper-division work. To be eligible for graduation, students must maintain a 2.0 GPA. In addition, a final grade of "C" or better must be earned in all courses with MATH, PHY, CST, EE, ENGR prefixes as well as in all technical elective courses.

Minors

Oregon Tech offers several Minors, including Applied Mathematics, Applied Physics Business, and others. Students should refer to the catalog (http://catalog.oit.edu) for a list of available Minors and corresponding course requirements. A minimum of 18 credits in the subject field outside the student's major field of study are required.

Concurrent Degree in Electrical Engineering and Renewable Energy Engineering

To obtain both degrees (BSEE and BSREE) students must complete all the courses required for the BSEE degree and the following BSREE courses. Consult with your advisor for details.

CHE 202/205	General Chemistry[1]	REE 3XX	REE Elective	3
CHE 260	Electrochemistry for RE	REE 3XX	REE Elective	3
ENGR 211	Statics	REE 412	Photovoltaic Systems[1]	3
ENGR 355	Thermodynamics[1]	REE 413	Electrical Power Conversion Sys.[1]	3
MECH 318	Fluid Mechanics	REE 463	Energy System Instrumentation[1]	3
MECH 323	Heat Transfer I	REE 4XX	REE Elective	3
REE 243	Electrical Power[1]	HIST 356	History of Energy[1] or	
REE 253	Electromech. Energy Conv.[1]	HIST 357	History of the Electric Grid[1]	3
EE 419	Power Electronics[1]			

[1] Can be used to meet BSEE degree requirements

Note: Students must complete a minimum of 36 credit hours in addition to the BSEE degree requirements in order to get a second degree.

Dual Majors

Students completing the BS in Electrical Engineering have the option of selecting a dual major by taking an additional year of coursework. The EERE department currently offers dual majors in Automation, Robotic, and Controls Engineering, Optical Engineering, and Systems Engineering and Technical Management. Students completing a BSEE degree with a dual major will receive a single BS degree in EE with both majors listed on their diploma and transcript.

For more information including requirements for each dual major, visit: https://www.oit.edu/academics/degrees/electrical-engineering/degree-options

BSEE + MSREE Program (4+1 or Concurrent)

Students may earn both BSEE and MSREE degrees, awarded simultaneously upon completion of this curriculum. Students enrolled in the BSEE program who have a proven record of academic excellence have the option of completing the MSREE with one additional year of coursework. Students pursuing this option follow the standard BSEE curriculum map during the first three years, start their graduate-level courses in the senior year, and complete the MSREE requirements during their fifth (graduate) year. To be eligible for this option, students must have a cumulative GPA of 3.0, and must contact the MSREE Program Director for admission into the graduate program by the end of Spring term of their junior year. Students will receive

For more information about the BSEE+MSREE Program, visit: https://www.oit.edu/academics/degrees/ms-ree

BSEE + MSE Program (4+1 or Concurrent)

Students enrolled in the BSEE program and showing a record of academic excellence have the option of completing this accelerated program and earn both the BSEE and MS Engineering degrees following a five-year course of study. Students with a minimum 3.0 GPA may apply to the accelerated BSEE + MSE program in their junior year, start taking graduate courses in their senior year, and complete the MSE degree requirements during their fifth (graduate) year.

Post-baccalaureate students interested in the MS Engineering program who do not have undergraduate degrees in engineering may also consider this accelerated program. Coursework from a first bachelor's degree can often be used to meet a number of BSEE degree requirements, allowing students to focus on the upper-division technical courses that will The MS Engineering is a flexible master's degree. Depending on their interest and career goals students can choose a multidisciplinary MSE, a specialized MSE, or a more classical MSE program such as the MSE in Electrical Engineering. For more information about the MSE and the accelerated BSEE + MSE Program, visit: https://www.oit.edu/mse